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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/845,344	05/01/2001	Richard W. Arnold	TI-27698.1	3689
23494	7590	02/08/2006	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			SARKAR, ASOK K	
			ART UNIT	PAPER NUMBER
			2891	

DATE MAILED: 02/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/845,344	ARNOLD ET AL.	
	Examiner	Art Unit	
	Asok K. Sarkar	2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Appeal Brief

1. The Appeal Brief filed on November 25, 2005 had wrongfully mentioned the original parent's Application Number instead of the current Application Number. The mistake has been corrected and the brief has been matched and placed in the current application.

Prosecution Reopened

2. Upon further reconsideration, the rejections set forth in the Office Action dated September 8, 2004 have been determined to be inaccurate. Accordingly, the previous rejection is withdrawn. The prosecution of the Application is now reopened.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Art Unit: 2891

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 13 – 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berlin, US 6,104,082 in view of Galloway, EP 633607.

Regarding these claims, Berlin discloses a semiconductor device comprising:

- (a) an electrically insulating substrate(interposer) 60 (see Fig. 2b, the insulating characteristic of the interposer is inherent) for application to a semiconductor carrier 68;
- (b) an interconnect pattern on said substrate 64a and 64b (shaded area);
- (c) a stud 62 coupled to said interconnect pattern over said substrate 60, said stud comprising a gold ball that is the ball of a ball bond in column 5, lines 9 – 63.

Berlin also discloses using a high temperature epoxy as a bump encapsulant in column 5, lines 55 – 60, but fails to teach a compliant material of epoxy resin coating over a portion of the gold ball.

Galloway teaches forming a compliant material of epoxy resin coating 18 (Gilleo, US 6,020,220 teaches that epoxy materials are inherently compliant in column 5, lines 5

– 36) over a portion of said gold ball in column 2, lines 11 – 19 and column 3, line 12 with reference to Figs. 1 and 2 for the benefit of providing a precise alignment between the die and the substrate in column 4, lines 11 – 27.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Berlin and provide a compliant material of epoxy resin coating over a portion of the gold ball for the benefit of providing a precise alignment between the die and the substrate as taught by Galloway in column 4, lines 11 – 27.

7. Claims 17 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berlin, US 6,104,082 in view of Galloway, EP 633607 as applied to claim 15 above, and further in view of Lytle, US 5,674,780.

Berlin in view of Galloway fails to teach the compliant epoxy material with silver – based flakes having sufficient hardness to penetrate the oxide film on the contact pads of the semiconductor devices.

Lytle teaches a method of forming an electrically conductive polymer bump in which they teach filling the epoxy resin with silver flakes in column 3, line 65 and column 4, line 1 for the benefit of providing conductivity to the epoxy.


Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to coat the gold ball by compliant epoxy resin filled with silver flakes for the benefit of providing conductivity as taught by Lytle in column 3, line 65 and column 4, line 1. The silver flakes will inherently have sufficient hardness to penetrate the oxide film on the contact pads of the semiconductor devices when pressure will be applied to make the contact.

Conclusion

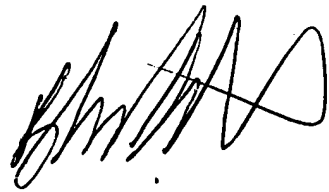
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asok K. Sarkar whose telephone number is 571 272 1970. The examiner can normally be reached on Monday - Friday (8 AM- 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William B. Baumeister can be reached on 571 272 1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Asok K. Sarkar
February 3, 2006

Primary Examiner


B. WILLIAM BAUMEISTER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800